

small vegetative individuals, there are at least 100 and possibly 200 plants in the area, making this one of the largest populations of *S. howellii* known.

Streptanthus howellii is confined to dry, brushy serpentine exposures between 650 and about 1000 m in the Siskiyou Mountains of Josephine and Curry counties, Oregon and Siskiyou and Del Norte counties, California. It is apparently a short-lived perennial or, perhaps, biennial. It is a candidate species for Federal listing under the Endangered Species Act, Category 2, USFWS (Federal Register 45:82480-82569, Dec. 15, 1980). Further information and figures are available (R. J. Meinke, 1982, Threatened and Endangered Vascular Plants of Oregon, An Illustrated Guide, USFWS, Office of Endangered Species, Region 1, Portland, Ore., pp. 314-315).

At the O'Brien site most of the large plants (about 15% of the population) bore one or more larvae of *A. lanceolata*. The single largest individual seen, a much-branched specimen over 1 m tall, had seven larvae and two eggs. Many of the smaller plants bore one or two eggs, generally on buds or on the axis of the raceme, rarely on leaves. Larvae were feeding actively on buds, flowers, and green fruit, and most of the siliques on the large plants were more or less damaged. A few plants had the entire inflorescence/inflorescence destroyed. Oviposition appeared to be correlated with phenophase, such that the most advanced plants bore the largest larvae; plants mostly in flower bore younger larvae and a few eggs; and plants in bud bore either eggs or nothing. No *lanceolata* were flying, and the latest plants to mature appeared likely to escape predation altogether. About a third of the eggs observed were dead, but the cause was not determined. Eight larvae were brought back for rearing; seven pupated and one produced an undetermined braconid parasitoid (Hymenoptera).

Meinke (loc. cit.) speculates that *S. howellii* may have "a poor reproductive capacity." If this is the case, seed predation by pierid larvae, perhaps not limited to *A. lanceolata*, may be an important factor in its biology. At O'Brien up to 75% of the seed crop appeared to be threatened (possibly less if the plants were able to regenerate and reproduce after the pierid feeding season) in 1983. Some other *Streptanthus* species on serpentine soils have evolved butterfly egg-mimics as an adaptation to predation-avoidance (Shapiro, 1981, Amer. Nat. 117:276-294), but *S. howellii* does not have them, and it is not known whether *A. lanceolata* engages in egg-load assessment (though its eggs are typical of species which do). If other pierid-crucifer systems are at all typical, we may expect the impact of predation on *S. howellii* to vary drastically from year to year, depending on how weather modifies the phenology of the plants and insects.

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HACKBERRY BUTTERFLIES: DENSE SWARMS INVOLVED IN A LITIGATION IN SOUTHERN LOUISIANA (NYMPHALIDAE: ASTEROCAMPA)

Hackberry butterflies (Nymphalidae, genus *Asterocampa*) are common insects of the central United States, ranging from southern New England westward throughout the mid-central United States to the Gulf of Mexico. They are especially abundant in the southern states of Arkansas, Texas, Mississippi, Louisiana, Alabama and western Tennessee. In this region there are three annual broods beginning about May and extending into July, with the greatest number of insects occurring in June and July (Holland, 1947, *The Butterfly Book*, Rev. Ed., Doubleday and Co., Garden City, NY, 424 pp.; Klots,

1951, *A Field Guide to the Butterflies of North America, East of the Great Plains*, Houghton Mifflin Co., Boston, MA, 349 pp.).

In common with other nymphalids, hackberry butterflies have long been known to occur in great clusters and swarms and to migrate. Their presence in Louisiana has been well documented on several occasions (Lambremont, 1954, *Tulane Stud. Zool.* 1:127-164; Ross & Lambremont, 1963, *J. Lepid. Soc.* 7:148-158). The fact that they occur in enormous population densities in the mid-southern United States has been recorded as long ago as 1888. For example, in May of that year enormous numbers were noted in flight, and the banks of the St. Frances River in Arkansas were reported to be lined with *Asterocampa celtis* Boisduval and Leconte for a distance of over thirty miles (Webster, 1888, *Holtzgang*, 1888, *Insect Life* 1:29 cited in Williams, 1930 below). In that same year it was reported that hackberry butterflies were swarming in great numbers over the southern United States and appeared to be migrating in a southerly direction (Williams, 1930, *The Migration of Butterflies*, *Biol. Monogr. and Manuals* Nr. 9, Edinburgh, Oliver and Boyd, London, 473 pp.).

In the months of June and July of 1980 I noted a very large swarm of hackberry butterflies in East Baton Rouge Parish, Louisiana. A particularly dense cluster was observed over a period of about three weeks in the southern part of the city of Baton Rouge. Several thousand could be seen at any given time throughout any sunny day in my backyard. The insects were clustered on fig trees, feeding on the ripe fruit. Some individual figs often had five to ten butterflies resting and feeding. Many alighted on me while I spent many hours watching their behavior and abundance. Both *A. celtis* and *A. clyton* Boisduval and Leconte were identified, with *A. celtis* being far more abundant, comprising about 90% of the total swarm. The behavioral habit of hackberry butterflies alighting on people, even as they work, has been noted in the earlier literature during dense swarms of these insects (Williams, 1930, *op. cit.*).

About a year later I was approached by a local attorney to identify an insect that factored in litigation between a homeowner and a painting contractor in West Baton Rouge Parish, Louisiana, directly across the Mississippi River from the City of Baton Rouge. The suit by the homeowner was to recover damages and cost of correcting poor workmanship in the exterior painting of a house. Large numbers of insects were stuck in the paint, and the painting workmen stated that they could not complete their work on the date promised because of large swarms of "moths" that were alighting on them and the freshly painted surfaces.

The homeowner had taken numerous color photographs of the house including many close-up views of the insects themselves. Since several thousands of dollars were involved, I was asked to serve as an expert witness and was provided a photograph dated July 1980. The photograph revealed intact male and female specimens and many detached wings, legs, antennae, and scales of *Asterocampa celtis*. From statements made at the trial, this species was swarming in numbers even greater than I had observed in the city. Their density and swarming and their behavior pattern of alighting on people as brought out in the hearings and well documented in the scientific literature, played a mitigating role for the defendants in this case.

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